

What is claimed is:

1. In a terminal of a conditional access system in which a user selects a service, the selected service being associated with a frequency, the terminal having a tuner and a secure element with at least one authorized entitlement unit number stored therein, a method of determining whether the terminal is authorized to receive the selected service, the method comprising steps of:

receiving at least one encrypted entitlement control message corresponding to the service;

decrypting each of the at least one encrypted entitlement control message in the secure element, each decrypted entitlement control message revealing at least one first entitlement number associated with the selected service; and

determining that the terminal is authorized to receive the selected service when any first entitlement number of any decrypted entitlement control message represents any number of the at least one authorized entitlement unit number.

2. The method of claim 1, further comprising initial steps of:

receiving over a permanently available link an entitlement unit table associating the selected service with at least one second entitlement number;

tuning the tuner of the terminal to the frequency associated with the selected service when any of said at least one second entitlement number represents any number of said at least one authorized entitlement unit number.

3. The method of claim 2, wherein the step of receiving over a permanently available data link includes receiving the entitlement unit table over an out of band data link.

4. The method of claim 2, wherein the step of receiving over a permanently available link includes receiving the entitlement unit table incorporated in a data packet that is included in a data stream associated with an initial power on frequency that is tunable by the tuner.

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5. The method of claim 2, wherein the step of receiving over a permanently available link includes receiving the entitlement unit table incorporated in a data packet that is included in a data stream associated with each frequency that is tunable by the tuner.

6. The method of claim 1, wherein the step of decrypting the at least one encrypted entitlement control message includes recovering at least one control word associated with decryption of a video component of the selected service.

7. The method of claim 1, wherein the step of decrypting the at least one encrypted entitlement control message includes recovering at least one control word associated with decryption of an audio component of the selected service.

8. The method of claim 1, wherein the step of receiving at least one encrypted entitlement control message includes demodulating an output of the tuner to recover a data component corresponding to the selected service, the data component containing the encrypted entitlement control message.

9. The method of claim 1, wherein the step of decrypting said at least one encrypted entitlement control message includes recovering at least one control word from said at least one decrypted entitlement control message, each control word being a decryption key for decrypting a corresponding service component of the selected service.

10. The method of claim 9, further comprising steps of:
recovering a first encrypted service component; and
decrypting the encrypted service component using a first control word of said at least one control word.

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11. The method of claim 1, further comprising steps of:
receiving an encrypted entitlement management message addressed to
the terminal; and
decrypting the encrypted entitlement management message in the
5 secure element, the decrypted entitlement management message including an update
of at least one authorized entitlement unit number to be stored in the secure element.

12. The method of claim 11, wherein the step of receiving an encrypted
entitlement management message includes receiving the encrypted entitlement
10 management message over an out of band data link.

13. The method of claim 11, wherein the step of receiving an encrypted
entitlement management message includes receiving the encrypted entitlement
management message incorporated in a data packet that is included in a data stream
15 associated with each frequency that is tunable by the tuner.

14. The method of claim 1, further comprising steps of:
receiving an entitlement management message addressed to the
terminal; and
20 authenticating the entitlement management message in the secure
element, the authenticated entitlement management message including an update of at
least one authorized entitlement unit number to be stored in the secure element.

15. The method of claim 14, wherein the step of receiving an entitlement
25 management message includes receiving the entitlement management message over
an out of band data link.

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16. The method of claim 14, wherein the step of receiving an entitlement management message includes receiving the entitlement management message incorporated in a data packet that is included in a data stream associated with each frequency that is tunable by the tuner.

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17. In a terminal of a conditional access system in which a user selects a service, the selected service being associated with a frequency, the terminal having a tuner and a secure element with at least one authorized entitlement unit number stored therein, a method of determining whether the terminal is authorized to receive the selected service, the method comprising steps of:

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receiving at least one entitlement control message corresponding to the service;

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authenticating each of the at least one entitlement control message in the secure element, each authenticated entitlement control message revealing at least one first entitlement number associated with the selected service; and

determining that the terminal is authorized to receive the selected service when any first entitlement number of any authenticated entitlement control message represents any number of the at least one authorized entitlement unit number.

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18. The method of claim 17, further comprising initial steps of:

receiving over a permanently available link an entitlement unit table associating the selected service with at least one second entitlement number;

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tuning the tuner of the terminal to the frequency associated with the selected service when any of said at least one second entitlement number represents any number of said at least one authorized entitlement unit number.

19. The method of claim 18, wherein the step of receiving over a permanently available data link includes receiving the entitlement unit table over an out of band data link.

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20. The method of claim 18, wherein the step of receiving over a permanently available link includes receiving the entitlement unit table incorporated in a data packet that is included in a data stream associated with an initial power on frequency that is tunable by the tuner.

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21. The method of claim 18, wherein the step of receiving over a permanently available link includes receiving the entitlement unit table incorporated in a data packet that is included in a data stream associated with each frequency that is tunable by the tuner.

22. The method of claim 17, wherein the step of authenticating the at least one entitlement control message includes recovering at least one control word associated with decryption of a video component of the selected service.

23. The method of claim 17, wherein the step of authenticating the at least one entitlement control message includes recovering at least one control word associated with decryption of an audio component of the selected service.

24. The method of claim 17, wherein the step of receiving at least one entitlement control message includes demodulating an output of the tuner to recover a data component corresponding to the selected service, the data component containing the entitlement control message.

25. The method of claim 17, wherein the step of authenticating said at least one entitlement control message includes recovering at least one control word from said at least one entitlement control message, each control word being a decryption key for decrypting a corresponding service component of the selected service.

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26. The method of claim 25, further comprising steps of:
recovering a first encrypted service component; and
decrypting the encrypted service component using a first control word
of said at least one control word.

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27. The method of claim 17, further comprising steps of:
receiving an encrypted entitlement management message addressed to
the terminal; and
decrypting the encrypted entitlement management message in the
10 secure element, the decrypted entitlement management message including an update
of at least one authorized entitlement unit number to be stored in the secure element.

28. The method of claim 27, wherein the step of receiving an encrypted
entitlement management message includes receiving the encrypted entitlement
15 management message over an out of band data link.

29. The method of claim 27, wherein the step of receiving an encrypted
entitlement management message includes receiving the encrypted entitlement
management message incorporated in a data packet that is included in a data stream
20 associated with each frequency that is tunable by the tuner.

30. The method of claim 17, further comprising steps of:
receiving an entitlement management message addressed to the
terminal; and
25 authenticating the entitlement management message in the secure
element, the authenticated entitlement management message including an update of at
least one authorized entitlement unit number to be stored in the secure element.

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31. The method of claim 30, wherein the step of receiving an entitlement management message includes receiving the entitlement management message over an out of band data link.

5 32. The method of claim 30, wherein the step of receiving an entitlement management message includes receiving the entitlement management message incorporated in a data packet that is included in a data stream associated with each frequency that is tunable by the tuner.

10 33. In a terminal of a conditional access system, the terminal including a tuner and a selector for selecting a service, the selected service being identified by a corresponding service number and frequency, a conditional access apparatus comprising:

15 a processor having plural control modules, a first control module controlling the processor to receive at least one encrypted entitlement control message corresponding to the selected service; and

20 a secure element having at least one authorized entitlement unit number stored therein and having plural control modules, a second control module controlling the secure element to decrypt each of the at least one encrypted entitlement control message, each decrypted entitlement control message revealing at least one first entitlement number associated with the selected service, a third control module controlling the secure element to determine that the terminal is authorized to receive the selected service when any first entitlement number of any decrypted entitlement control message represents any number of the at least one authorized entitlement unit
25 number.

34. The apparatus of claim 33, wherein:

30 the processor further includes a fourth control module controlling the processor to receive over a permanently available link an entitlement unit table associating the selected service with at least one second entitlement number; and

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the processor further includes a fifth control module controlling the processor to tune the tuner of the terminal to the frequency associated with the selected service when any of said at least one second entitlement number represents any number of said at least one authorized entitlement unit number.

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35. The apparatus of claim 34, wherein the fourth control module includes a control module to receive the entitlement unit table over an out of band data link.

36. The apparatus of claim 34, wherein the fourth control module includes a control module to receive the entitlement unit table incorporated in a data packet that is included in a data stream associated with an initial power on frequency that is tunable by the tuner.

37. The apparatus of claim 34, wherein the fourth control module includes a control module to receive the entitlement unit table incorporated in a data packet that is included in a data stream associated with each frequency that is tunable by the tuner.

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P27 38. ~~The apparatus of claim 33, wherein the second control modules includes a control module to recover at least one control word associated with decryption of a video component of the selected service.~~

39. The apparatus of claim 33, wherein the second control module includes a control module to recover at least one control word associated with decryption of an audio component of the selected service.

40. The apparatus of claim 33, wherein the first control module includes a control module to demodulate an output of the tuner to recover a data component corresponding to the selected service, the data component containing the encrypted entitlement control message.

41. The apparatus of claim 33, wherein the second control module includes a control module to recover at least one control word from said at least one decrypted entitlement control message, each control word being a decryption key for decrypting
5 a corresponding service component of the selected service.

42. The apparatus of claim 41, further comprising:
a fourth control module to control the processor to recover a first encrypted service component; and
10 a decryptor to decrypt the encrypted service component using a first control word of said at least one control word.

43. The apparatus of claim 33, further comprising:
a fourth control module to control the processor to receive an encrypted entitlement management message addressed to the terminal; and
15 a fifth control module to control the secure element to decrypt the encrypted entitlement management message, the decrypted entitlement management message including an update of at least one authorized entitlement unit number to be stored in the secure element.

44. The apparatus of claim 43, wherein the fourth control module includes a control module to receive the encrypted entitlement management message over an out of band data link.

45. The apparatus of claim 43, wherein the fourth control module includes a control module to receive the encrypted entitlement management message incorporated in a data packet that is included in a data stream associated with each frequency that is tunable by the tuner.

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46. The apparatus of claim 33, further comprising:
a fourth control module to control the processor to receive an entitlement management message addressed to the terminal; and
a fifth control module to control the secure element to authenticate the entitlement management message, the authenticated entitlement management message including an update of at least one authorized entitlement unit number to be stored in the secure element.

47. The apparatus of claim 46, wherein the fourth control module includes a control module to receive the entitlement management message over an out of band data link.

48. The apparatus of claim 46, wherein the fourth control module includes a control module to receive the entitlement management message incorporated in a data packet that is included in a data stream associated with each frequency that is tunable by the tuner.

49. In a terminal of a conditional access system, the terminal including a tuner and a selector for selecting a service, the selected service being identified by a corresponding service number and frequency, a conditional access apparatus comprising:

a processor having plural control modules, a first control module controlling the processor to receive at least one entitlement control message corresponding to the selected service; and

a secure element having at least one authorized entitlement unit number stored therein and having plural control modules, a second control module controlling the secure element to authenticate each of the at least one entitlement control message, each entitlement control message revealing at least one first entitlement number associated with the selected service, a third control module controlling the secure element to determine that the terminal is authorized to receive

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the selected service when any first entitlement number of any authenticated entitlement control message represents any number of the at least one authorized entitlement unit number.

5 50. The apparatus of claim 49, wherein:

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the processor further includes a fourth control module controlling the processor to receive over a permanently available link an entitlement unit table associating the selected service with at least one second entitlement number; and

10 the processor further includes a fifth control module controlling the processor to tune the tuner of the terminal to the frequency associated with the selected service when any of said at least one second entitlement number represents any number of said at least one authorized entitlement unit number.

15 51. The apparatus of claim 50, wherein the fourth control module includes a control module to receive the entitlement unit table over an out of band data link.

20 52. The apparatus of claim 50, wherein the fourth control module includes a control module to receive the entitlement unit table incorporated in a data packet that is included in a data stream associated with an initial power on frequency that is tunable by the tuner.

25 53. The apparatus of claim 50, wherein the fourth control module includes a control module to receive the entitlement unit table incorporated in a data packet that is included in a data stream associated with each frequency that is tunable by the tuner.

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30 ~~54. The apparatus of claim 49, wherein the second control modules includes a control module to recover at least one control word associated with decryption of a video component of the selected service.~~

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55. The apparatus of claim 49, wherein the second control module includes a control module to recover at least one control word associated with decryption of an audio component of the selected service.

5 56. The apparatus of claim 49, wherein the first control module includes a control module to demodulate an output of the tuner to recover a data component corresponding to the selected service, the data component containing the entitlement control message.

10 57. The apparatus of claim 49, wherein the second control module includes a control module to recover at least one control word from said at least one entitlement control message, each control word being a decryption key for decrypting a corresponding service component of the selected service.

15 58. The apparatus of claim 57, further comprising:
a fourth control module to control the processor to recover a first encrypted service component; and
a decryptor to decrypt the encrypted service component using a first control word of said at least one control word.

20 59. The apparatus of claim 49, further comprising:
a fourth control module to control the processor to receive an encrypted entitlement management message addressed to the terminal; and
a fifth control module to control the secure element to decrypt the
25 encrypted entitlement management message, the decrypted entitlement management message including an update of at least one authorized entitlement unit number to be stored in the secure element.

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60. The apparatus of claim 59, wherein the fourth control module includes a control module to receive the encrypted entitlement management message over an out of band data link.

5 61. The apparatus of claim 59, wherein the fourth control module includes a control module to receive the encrypted entitlement management message incorporated in a data packet that is included in a data stream associated with each frequency that is tunable by the tuner.

10 62. The apparatus of claim 49, further comprising:
a fourth control module to control the processor to receive an entitlement management message addressed to the terminal; and
a fifth control module to control the secure element to authenticate the entitlement management message, the authenticated entitlement management message
15 including an update of at least one authorized entitlement unit number to be stored in the secure element.

20 63. The apparatus of claim 62, wherein the fourth control module includes a control module to receive the entitlement management message over an out of band data link.

25 64. The apparatus of claim 62, wherein the fourth control module includes a control module to receive the entitlement management message incorporated in a data packet that is included in a data stream associated with each frequency that is tunable by the tuner.